# Indoor Environmental Quality

# IEQ Prerequisite 5.R1: Minimum IAQ Performance

**INTENT:** Establish minimum IAQ performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.

**REQUIREMENT:** Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda.

# IEQ Prerequisite 5.R1: Minimum IAQ Performance

**SUBMITTALS:**

- Provide a letter from the mechanical engineer stating compliance with ASHRAE 62-1999.
- Declare the ASHRAE 62-1999 procedure employed in the IAQ analysis was the Ventilation Rate Procedure and include design criteria and assumptions.

# IEQ Prerequisite 5.R1: Minimum IAQ Performance

**PROJECT DOCUMENTS:**

- ***Specifications:*** 01800 Facility Operation, and 15950 Testing/Adjusting/Balancing.
- ***Drawings:*** Include a note on the first sheet of the mechanical drawings indicating desired compliance with ASHRAE 62-1999.
- ***Design Analysis:*** Include a section in the design analysis describing the ventilation systems and how the project complies with ASHRAE 62-1999. Also state design criteria and assumptions.

# IEQ Prerequisite 5.R2: Environmental Tobacco Smoke (ETS) Control

**INTENT:** Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).

**REQUIREMENT:** Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, **OR**, by providing a designated smoking room designed to effectively contain, capture and remove ETS from the building.

# IEQ Prerequisite 5.R2: Environmental Tobacco Smoke (ETS) Control

**SUBMITTALS:**

- Provide a letter from the building owner verifying the building policy prohibiting smoking. Include site drawings highlighting designated smoking areas, if applicable.
- Provide drawings and a narrative demonstrating that designated smoking rooms exhaust to the outdoors and have independent ventilation systems.
- Provide a letter from the testing engineer stating compliance with ASHRAE 129-1997 for the smoking areas. Include the tracer gas analysis report per ASHRAE 129-1997, Section 8.

# IEQ Prerequisite 5.R2: Environmental Tobacco Smoke (ETS) Control

**PROJECT DOCUMENTS:**

- ***Specifications:*** 01800 Facility Operation, and 15950 Testing/Adjusting/Balancing.
- ***Drawings:*** Indicate designated outdoor smoking areas on the Site Plan (if applicable).
- ***Design Analysis:*** Provide a narrative discussing how the facility addresses ETS. If applicable, provide test plan for using tracer gas testing methods as described in the ASHRAE Standard 129-1997. Testing as described in ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.

# IEQ Credit 5.C1: Carbon Dioxide (CO2) Monitoring

**INTENT:** Provide capacity for indoor air quality (IAQ) monitoring to sustain long-term occupant health and comfort.

**REQUIREMENT: (1 point)** - Install a permanent carbon dioxide (CO2) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor levels by more than 530 parts per million at any time.

# IEQ Credit 5.C1:
# Carbon Dioxide (CO2) Monitoring

**SUBMITTALS:** Provide drawings, specifications, and cut sheets highlighting the installed carbon dioxide monitoring system. Include a narrative describing the sequence of operation and control of building ventilation systems and initial operation set points.

**PROJECT DOCUMENTS:**

- ***Specifications:*** 01800 Facility Operation, 13850 Detection and Alarm, and 15950 Testing/Adjusting/Balancing. Specifically note that indoor CO2 levels should never be permitted to exceed outdoor levels by more than 530 parts per million.
- ***Drawings:*** Highlight the location of CO2 monitoring equipment in the Mechanical Drawings. Also state the set-point parameters.
- ***Design Analysis:*** Include a narrative describing the sequence of operation and control of building ventilation systems, how the CO2 monitoring will be interfaced, and initial operation set points.

# IEQ Credit 5.C2: Increase Ventilation Effectiveness

**INTENT:** Provide for the effective delivery and mixing of fresh air to support the health, safety, and comfort of building occupants.

**REQUIREMENT: (1 point)** - For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (E) greater than or equal to **0.9** as determined by ASHRAE 129-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than **90%** of the room or zone area in the direction of air flow for at least **95%** of hours of occupancy.

# IEQ Credit 5.C2: Increase Ventilation Effectiveness

**SUBMITTALS:**

- For mechanically ventilated buildings, provide a report summarizing test results and calculations demonstrating an air-change effectiveness rating of 0.9 or greater as determined by ASHRAE 129-1997, Appendix B. If E is less than 0.9, provide documentation indicating the corrected design ventilation rate (CDVR) used in the system design.

# IEQ Credit 5.C2: Increase Ventilation Effectiveness

**SUBMITTALS (cont):**

**OR**

- For mechanically ventilated buildings, provide a design narrative that describes compliance with the recommended approaches in ASHRAE Fundamentals Chapter 32, Space Air Diffusion.
- For naturally ventilated spaces, provide airflow simulation results including locations of inlets, outlets, and flow patterns. Provide a narrative describing the sequence of operations of the ventilation system and demonstrate that the distribution and flow patterns meet the criteria.

# IEQ Credit 5.C2: Increase Ventilation Effectiveness

**PROJECT DOCUMENTS:**

- Specifications: NA
- Drawings: Mechanical and ventilation layout
- Design Analysis: Provide design narrative describing compliance with ASHRAE Fundamentals Chapter 32 along with plan and elevation drawings including furniture for each major room type. Graphically show how the airflow patterns are designed to meet the requirements of this credit. Also include a specification table of all the terminal vents, grills, and registers cross-referenced in the drawings.

# IEQ Credit 5.C3: Construction IAQ Management Plan

**INTENT:** Prevent indoor air quality problems resulting from the construction/renovation process, to sustain long-term installer and occupant health and comfort.

**REQUIREMENTS:** Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and preoccupancy phases of the building as follows:

# IEQ Credit 5.C3: Construction IAQ Management Plan

- **Credit 5.C3.1 During Construction (1 point)** During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Con-tractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture dam-age, AND replace all filtration media immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999.

# IEQ Credit 5.C3: Construction IAQ Management Plan

**SUBMITTALS:**

- Provide a copy of the Construction IAQ Management Plan highlighting the six requirements of SMACNA IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3.
- Provide photographs of construction IAQ management measures such as protection of ducts and on-site stored or installed absorptive materials.
- Provide cut sheets of filtration media used during construction and installed prior to occupancy with MERV values highlighted.

# IEQ Credit 5.C3: Construction IAQ Management Plan

**PROJECT DOCUMENTS:**

- ***Specifications:*** NA
- ***Drawings:*** Note filter requirements on mechanical drawings.
- ***Design Analysis:*** Provide a copy of the Construction IAQ Management Plan to be implemented during construction and pre-occupancy. Highlight areas that demonstrate how the SMACNA guidelines will be met or exceeded.

# IEQ Credit 5.C3: Construction IAQ Management Plan

- **Credit 5.C3.2 After Construction (1 point)** Conduct a minimum two-week building flush-out with new filtration media at **100%** outside air after construction ends and prior to occupancy, **OR** conduct a baseline indoor air quality testing procedure consistent with current EPA Protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445.

# IEQ Credit 5.C3: Construction IAQ Management Plan

**SUBMITTALS:**

- Provide a letter from the architect or engineer describing the building flushout procedures including actual dates of building flushout.

**OR**

- Provide specifications and documentation demonstrating conformance with IAQ testing procedures and requirements as described in the EPA protocol.

# IEQ Credit 5.C3: Construction IAQ Management Plan

**PROJECT DOCUMENTS:**

- ***Specifications:*** NA
- ***Drawings:*** NA
- ***Design Analysis:*** Provide a letter from the architect or engineer detailing the building flush-out process, or provide a letter specifying an indoor air quality test to be performed in accordance with the EPA Protocol following construction.

# IEQ Credit 5.C4:
# Low Emitting Materials

**INTENT:** Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort.

**REQUIRMENTS:** Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:

# IEQ Credit 5.C4: Low Emitting Materials

- **Credit 5.C4.1 (1 point)** Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, **AND** all sealants used as a filler must meet or exceed Bay Area Air Quality Management District Reg. 8, Rule 51.
- **Credit 5.C4.2 (1 point)** Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements.

# IEQ Credit 5.C4: Low Emitting Materials

- **Credit 5.C4.3 (1 point)** Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program.
- **Credit 5.C4.4 (1 point)** Composite wood and agrifiber products must contain no added urea-formaldehyde resins.

# IEQ Credit 5.C4:
# Low Emitting Materials

**SUBMITTALS:**

- Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each adhesive used in the project highlighting VOC content.
- Provide a cut sheet and MSDS for each sealant used in the project highlighting VOC content.
- Provide a cut sheet and MSDS for each paint or coating used in the project highlighting VOC content.
- Provide a cut sheet and MSDS for each carpet product used in the project highlighting VOC content.
- Provide a cut sheet for each composite wood or agrifiber product used in the project highlighting urea-formaldehyde resin limits.

# IEQ Credit 5.C4:
# Low Emitting Materials

**PROJECT DOCUMENTS:**

- ***Specifications:*** 05950 Paints & Protective Coatings, 06100 Rough Carpentry, 06600 Plastic Fabrications, 07900 Joint Sealers, 09600 Flooring, 09700 Wall Finishes, and 09900 Paints & Coatings.
- ***Drawings:*** NA
- ***Design Analysis:*** Provide narrative of VOC control strategies.

# IEQ Credit 5.C5: Indoor Chemical and Pollutant Source Control

**INTENT:** Avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

**REQUIRMENT: (1 point)** Design to minimize cross-contamination of regularly occupied occupancy areas by chemical pollutants: Employ permanent entry way systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways,

# IEQ Credit 5.C5: Indoor Chemical and Pollutant Source Control

**AND** provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), **AND** provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

# IEQ Credit 5.C5: Indoor Chemical and Pollutant Source Control

**SUBMITTALS:**

- Provide drawings and cut sheets highlighting entryways systems, including locations of entryways into the building.
- Provide a narrative and drawings highlighting the deck-to-deck physical separation and independent ventilation system of chemical use areas and copy rooms.
- Provide a narrative and drawings highlighting the plumbing system employed in the chemical mixing areas.

# IEQ Credit 5.C5: Indoor Chemical and Pollutant Source Control

**PROJECT DOCUMENTS:**

- ***Specifications:*** 08400 Entrances, 12400 Furnishings and Accessories, and 15100 Building Services Piping.
- ***Drawings:*** Note permanent entryway systems such as grills, grates, etc. at all exterior entrances on the First Floor Plan or other plan sheets with building entrances from outdoors. Cross-reference and highlight positive pressure systems for entryways with the Mechanical Plans. Also highlight the exhaust air systems used in chemical use areas (housekeeping and copy/print rooms). Highlight drainage systems for rooms where chemical and water mixing may occur in the Plumbing Plans and Plumbing Schematics.
- ***Design Analysis:*** Provide narrative discussing compliance approaches and referencing specifications and drawings.

# IEQ Credit 5.C6: Controllability of Systems

**INTENT:** Provide a high level of individual occupant control of thermal, ventilation, and lighting systems to support optimum health, productivity, and comfort conditions.

**REQUIREMENTS:**

- **Credit 5.C6.1 (1 point)** Provide a minimum of one operable window and one lighting control zone per 200 SF for all occupied areas within 15 feet of the perimeter wall.
- **Credit 5.C6.2 (1 point)** Provide controls for each individual for airflow, temperature, and lighting for 50% of the non-perimeter, regularly occupied areas.

# IEQ Credit 5.C6: Controllability of Systems

**SUBMITTALS:**

- **5.C6.1** For regularly occupied areas, provide drawings and cut sheets highlighting operable windows and lighting controls for perimeter areas of the building. Include calculations summarizing the total perimeter occupied area and number of operable windows and lighting systems.

# IEQ Credit 5.C6: Controllability of Systems

**SUBMITTALS:**

- **5.C6.2** For regularly occupied non-perimeter areas, provide drawings and cut sheets highlighting airflow, temperature, and lighting controls. Include calculations summarizing the total non-perimeter occupied area, number of occupants, and number of airflow, temperature, and lighting controls.

# IEQ Credit 5.C6: Controllability of Systems

**PROJECT DOCUMENTS 5.C6.1 Perimeter:**

- ***Specifications:*** 08500 Windows, and 15900 HVAC Instrumentation and Controls.
- ***Drawings:*** Provide a window schedule highlighting the operable windows for rooms with floor area within 15 feet of the perimeter. Highlight the location lighting controls on the Electrical Plan.
- ***Design Analysis:*** Provide a floor plan diagram showing a line indicating 15 feet from building perimeter. Demonstrate with calculations that each room within 15 feet of the perimeter has at least one operable window and one lighting control zone for every 200 square feet of floor area that is regularly occupied.

# IEQ Credit 5.C6: Controllability of Systems

**PROJECT DOCUMENTS 5.C6.2 Non-Perimeter:**

- ***Specifications:*** 15900 HVAC Instrumentation and Controls.
- ***Drawings:*** Indicate lighting controls on the Electrical Plan. Highlight temperature and airflow controls on the Mechanical Plan, or Air Distribution Plan. Indicate the expected occupancy of each non-perimeter room on the Floor Plan.
- ***Design Analysis:*** Provide a floor plan diagram showing a line indicating 15 feet from building perimeter. Demonstrate with a table or other calculations that lighting and airflow controls have been provided for each occupant for all regularly occupied rooms not within 15 feet of the building perimeter.

# IEQ Credit 5.C7: Thermal Comfort

**INTENT:** Provide for a thermally comfortable environment that supports the productive and healthy performance of the building occupants.

**REQUIREMENTS:**

- **Credit 5.C7.1 (1 point)** Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone.
- **Credit 5.C7.2 (1 point)** Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building.

# IEQ Credit 5.C7: Thermal Comfort

## SUBMITTALS:

- **5.C7.1** Provide a letter from the mechanical engineer confirming that the project complies with ASHRAE Standard 55-1992, Addenda 1995. Include design criteria and assumptions of thermal comfort including temperature, humidity, and air movement ranges.
- **5.C7.2** Provide drawings, specifications, and cut sheets highlighting the installed permanent temperature and humidity monitoring system. Include a narrative describing measurement points and operator interface.

# IEQ Credit 5.C7: Thermal Comfort

**PROJECT DOCUMENTS 5.C7.1 ASHRAE 55-1992:**

- ***Specifications:*** NA
- ***Drawings:*** NA
- ***Design Analysis:*** Provide a narrative describing how the HVAC the system design complies with ASHRAE standard 55-1992, Addenda 1995. For naturally ventilated systems, provide a letter from the mechanical engineer stating that the project complies with the 90% acceptability limits of the adaptive comfort temperature boundaries in the Collaborative for High Performance Schools (CHPS) Best Practices Manual Appendix C – A Field Based Thermal Comfort Standard for Naturally Ventilated Buildings, Figure 2.

# IEQ Credit 5.C7: Thermal Comfort

**PROJECT DOCUMENTS 5.C7.2 Permanent Monitoring System:**

- ***Specifications:*** 13400 Measurement and Control Instrumentation, 13500 Recording Instrumentation, and 13800 Building Automation and Control
- ***Drawings:*** Highlight the location of temperature and humidity monitoring systems on the Mechanical Plan or Air Distribution Plan.
- ***Design Analysis:*** Provide a narrative from the mechanical engineer describing the location of, and monitoring instrumentation installed. Reference appropriate plan sheets where the equipment discussed is shown.

# IEQ Credit 5.C8: Daylight and Views

**INTENT:** Provide for the building occupants a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

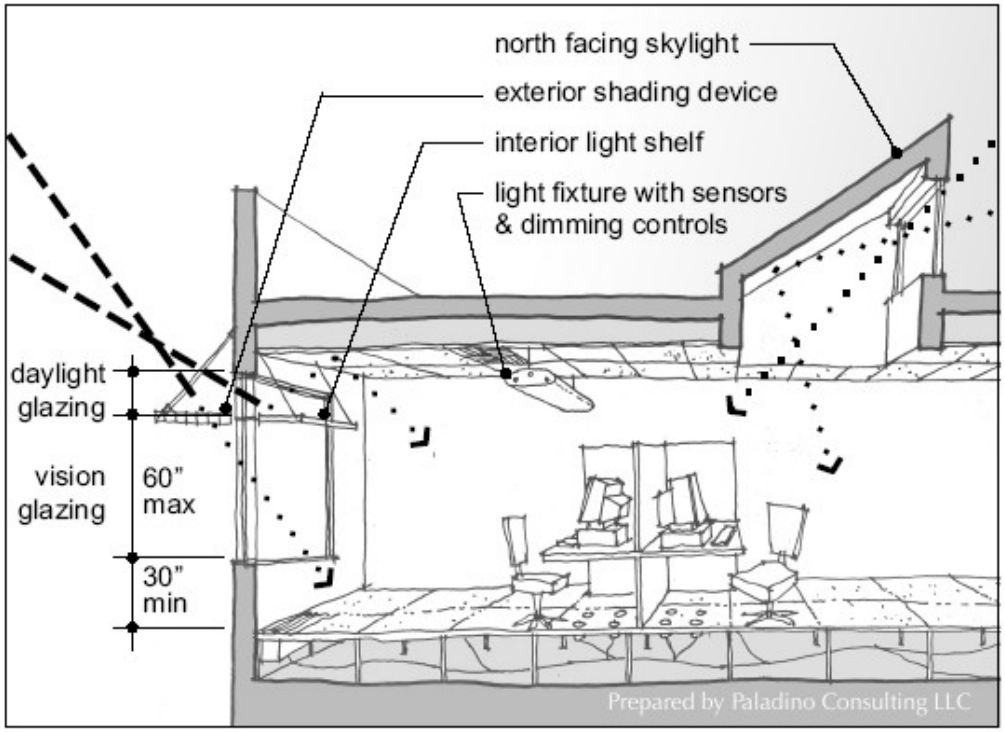



**Figure 1**: An Illustration of Various Daylighting Strategies

# IEQ Credit 5.C8: Daylight and Views

**REQUIREMENTS:**

- **Credit 5C8.1 (1 point)** Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks. Spaces excluded from this requirement include copy rooms, storage areas, mechanical plant rooms, laundry and other low occupancy support areas. Other exceptions for spaces where tasks would be hindered by the use of daylight will be considered on their merits.
- **Credit 5C8.2 (1 point)** Achieve direct line of sight to vision glazing for building occupants in 90% of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry and other low occupancy support areas. Other exceptions for spaces where tasks would be hindered by the use of daylight will be considered on their merits.

# IEQ Credit 5.C8: Daylight and Views

**SUBMITTALS 5.C8.1 Distribution Quality:**

- Provide drawing with a narrative highlighting critical visual task areas and typical room sections showing shading devices for direct sun control.
- Include area calculations defining the daylight zone and daylight prediction calculations demonstrating a minimum Daylight Factor of 2% in these areas.

**OR**

- Include area calculations defining the daylight zone and daylight simulation results demonstrating a minimum Daylight Factor of 2% in these areas.

# IEQ Credit 5.C8: Daylight and Views

**Daylighting Calculations:** The Daylight Factor (DF) is the ratio of exterior illumination to interior illumination and is expressed as a percentage. The variables used to determine the daylight factor include the floor area, window area, window geometry, visible transmittance (Tvis ) and window height. This calculation method aims to provide a minimum 2% DF at the back of a space.

# IEQ Credit 5.C8: Daylight and Views

- **Daylighting Calculations (cont):**
  - **1.** Create a spreadsheet and identify all regularly occupied rooms and their areas.
  - **2.** For each room identified, calculate the window area and use **Table 1** to indicate the acceptable window types. Note that window areas above 7’6” are considered to be daylight glazing. Window areas from 2’6” to 7’6” are considered to be vision glazing. Window areas below 2’6” do not contribute to daylighting of interior spaces and are excluded from the calculations.
  - **3.** For each window type, insert the appropriate geometry and height factors as listed in **Table 1**.
  - **4.** For each window type, indicate the visible transmittance (Tvis), a variable number that differs for each product. Tvis is the recommended level of transmittance for selected glazing.

# IEQ Credit 5.C8: Daylight and Views

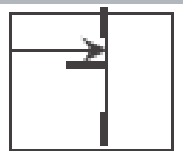
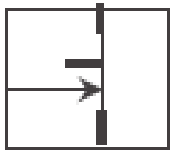
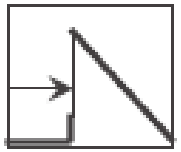
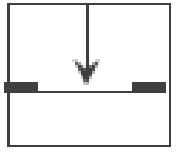
**Daylighting Calculations (cont):**

- **5.** Calculate the Daylight Factor for each window type using **Equation 1**. For rooms with more than one window type, sum all window types to obtain a total Daylight Factor for the room.
- **6.** If the total daylight factor for a room is 2% or greater, then the square footage of the room is applicable to the credit.
- **7.** Sum the square footage of all applicable rooms and divide by the total square footage of all regularly occupied spaces. If this percentage is greater than 75%, then the building qualifies for the first point of the credit.
- **8.** Note that glare control is also required for each window. **Table 1** provides best practice glare control measures for different window types. Create a second spreadsheet that identifies the type of glare control applied to each window

Equation 1:

$$\text{Daylight Factor} = \frac{\text{Window Area [SF]}}{\text{Floor Area [SF]}} \times \text{Window Geometry} \times \frac{\text{Actual } T_{vis}}{\text{Minimum } T_{vis}} \times \text{Window Height Factor}$$

Table 1: Daylight Design Criteria

| Window Type | Geometry Factor | Minimum $T_{vis}$ | Height Factor | Best Practice Glare Control |
|---|---|---|---|---|
|  sidelight daylight glazing | 0.1 | 0.7 | 1.4 | Adjustable blinds<br>Interior light shelves<br>Fixed translucent exterior shading devices |
|  sidelighting vision glazing | 0.1 | 0.4 | 0.8 | Adjustable blinds<br>Exterior shading devices |
|  toplighting vertical monitor | 0.2 | 0.4 | 1.0 | Fixed interior<br>Adjustable exterior blinds |
| toplighting sawtooth monitor | 0.33 | 0.4 | 1.0 | Fixed interior<br>Exterior louvers |
|  toplighting horizontal skylights | 0.5 | 0.4 | 1.0 | Interior fins<br>Exterior fins<br>Louvers |

**Glare Control Chart**

| Type | Description |
|---|---|
| 1 | Fixed Exterior Shading Devices |
| 2 | Light shelf, exterior |
| 3 | Light Shelf, interior |
| 4 | Interior Blinds |
| 5 | Pull-down shades |
| 6 | Fritted glazing |
| 7 | Drapes |
| 8 | Electronic black-out glazing |

Table 2: Sample Daylighting Calculations

| Room | Floor Area | Glazing Area | Window Geometry | | Transmittance ($T^{vis}$) | | Window Height | Daylight Factor | | Daylit Area | Glare Control |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | [SF] | [SF] | Type | Factor | Actual | Minimum | Factor | Each | Room | [SF] | |
| A | 820 | 120 | vision | 0.1 | 0.9 | 0.4 | 0.8 | 2.6% | 3.3% | 820 | 2 |
| | | 40 | daylight | 0.1 | 0.7 | 0.7 | 1.4 | 0.7% | | | 3 |
| B | 410 | 75 | vision | 0.1 | 0.9 | 0.4 | 0.8 | 3.3% | 4.1% | 410 | 2 |
| | | 25 | daylight | 0.1 | 0.7 | 0.7 | 1.4 | 0.9% | | | 3 |
| C | 120 | 36 | vision | 0.1 | 0.4 | 0.4 | 0.8 | 2.4% | 2.4% | 120 | 2 |
| D | 95 | 25 | vision | 0.1 | 0.4 | 0.4 | 0.8 | 2.1% | 2.1% | 95 | 2 |
| E | 410 | 75 | vision | 0.1 | 0.9 | 0.4 | 0.8 | 3.3% | 4.1% | 410 | 2 |
| | | 25 | daylight | 0.1 | 0.7 | 0.7 | 1.4 | 0.9% | | | 3 |
| F | 820 | 75 | vision | 0.1 | 0.9 | 0.4 | 0.8 | 1.6% | 2.1% | 820 | 2 |
| | | 25 | daylight | 0.1 | 0.7 | 0.7 | 1.4 | 0.4% | | | 3 |
| G | 600 | 36 | vision | 0.1 | 0.4 | 0.4 | 0.8 | 0.5% | 0.5% | 0 | 2 |
| H | 120 | 36 | vision | 0.1 | 0.4 | 0.4 | 0.8 | 2.4% | 2.4% | 120 | 6 |
| I | 95 | 32 | vision | 0.1 | 0.4 | 0.4 | 0.8 | 2.7% | 2.7% | 95 | 6 |
| J | 95 | 32 | vision | 0.1 | 0.4 | 0.4 | 0.8 | 2.7% | 2.7% | 95 | 1 |
| K | 410 | 36 | sawtooth | 0.33 | 0.4 | 0.4 | 1.0 | 2.9% | 2.9% | 410 | 4 |
| **TOTAL** | **3,730** | | | | | | | | | **3,395** | |
| **Percentage of Daylit Area** | | | | | | | | | | **85%** | |

# IEQ Credit 5.C8: Daylight and Views

**SUBMITTALS 5.C8.2 Access to Views:**

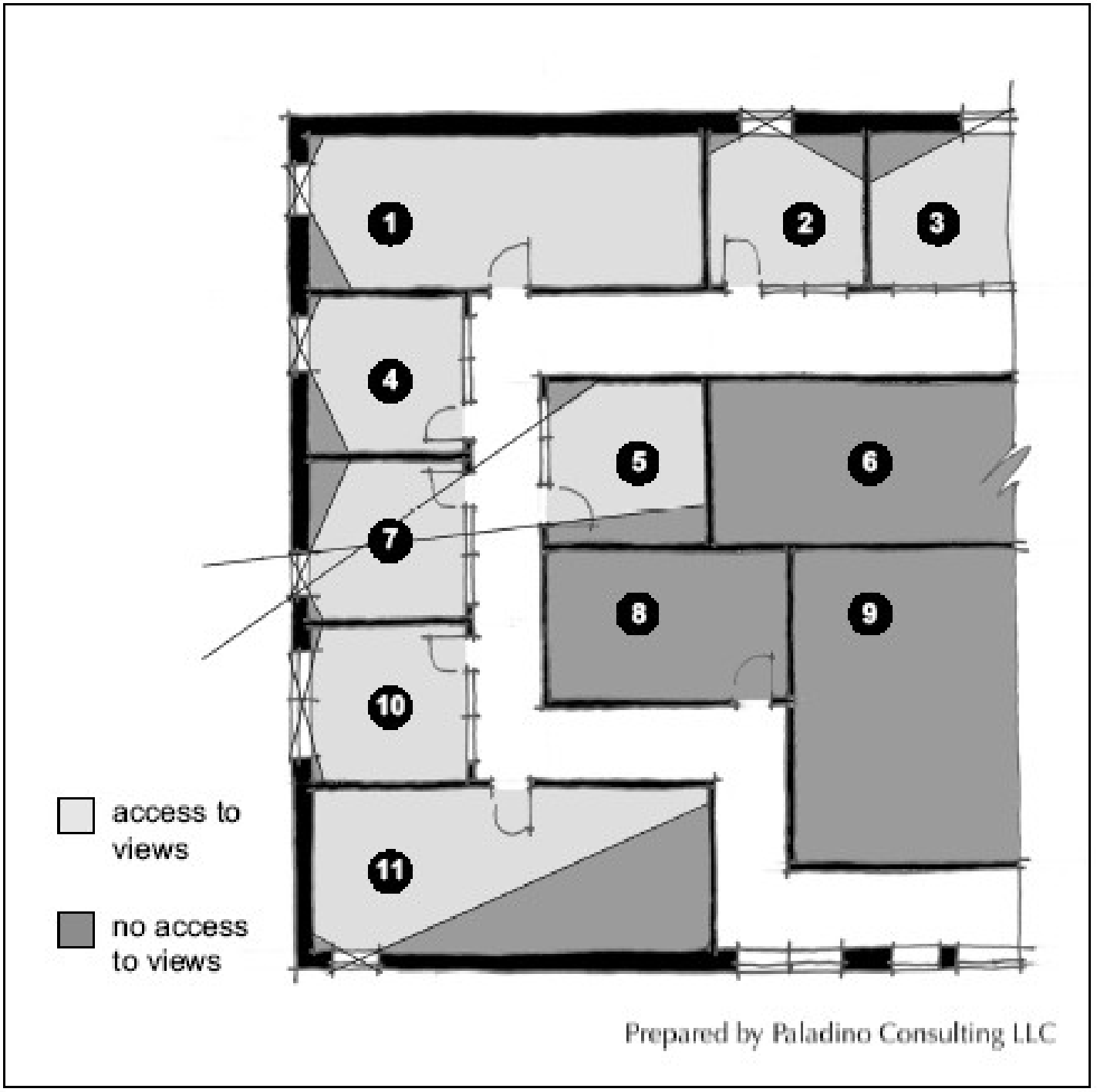
- Provide drawings and a narrative highlighting direct line of sight zones. Include calculations demonstrating 90% of these zones have direct lines of site to perimeter glazing.

# IEQ Credit 5.C8: Daylight and Views

**Access to Views Calculations:**

- **1.** Note if it is possible to view vision glazing in each regularly occupied room. Windows below 2’6” and windows above 7’6” (including daylight glazing, skylights and roof monitors) do not qualify for the credit. Construct line of sight geometries at each window to identify non-view areas in each room (see **Figure 2** for guidance). If the view area is greater than or equal to 90% of the room area, then the square footage of the **entire** room is applicable to the credit. For non-perimeter spaces with vision glazing, include a narrative and detailed building section drawing to explain access to views.

**2.** Sum the square footage of all applicable rooms and divide by the total square footage of all regularly occupied spaces. If this percentage is greater than 90%, then the building qualifies for the vision credit.



# IEQ Credit 5.C8: Daylight and Views

**PROJECT DOCUMENTS**

- ***Specifications*:** NA
- ***Drawings:*** NA
- ***Design Analysis:***
  - **5.C8.1 Distribution Quality:** Provide room plans and calculations based on the Daylight Factor equation from the LEED2.0 Reference Guide showing that 75% of all spaces occupied for critical visual tasks have at least a 2% daylight factor.
  - **5.C8.2 Access to Views:** Provide room plans and calculations with a supporting floor plan diagrams indicating the lines of sight and access to views for 90% of occupied spaces .

# IEQ Credit 5.C9: Acoustic Environmental/Noise Control

**INTENT:** Provide appropriate acoustic conditions for user privacy and comfort.

**REQUIRMENT: (1 point)** Minimize environmental noise through appropriate use of insulation, sound-absorbing materials and noise source isolation.

**SUBMITTALS:** Provide a narrative along with cut sheets, specifications, and appropriate drawings discussing noise control techniques incorporated in the project.

# IEQ Credit 5.C9: Acoustic Environmental/Noise Control

**Project Documents:**

- ***Specifications*:** 13080 Sound, Vibration, and Seismic Control
- ***Drawings:*** Mechanical and Architectural Drawing, plans, elevations, and details
- ***Design Analysis:*** Provide a narrative detailing the existing environmental noise issues and describe the measures employed to mitigate the environmental noise issues.

# IEQ Credit 5.C10: Facility In-Use IAQ Management Plan

**INTENT:** Insure the effective management of facility air quality during its life.

**REQUIRMENT: (1 point)** Perform all of the following:

- Develop an air quality action plan to include scheduled HVAC system cleaning.
- Develop an air quality action plan to include education of occupants and facility managers on indoor pollutants and their roles in preventing them.

# IEQ Credit 10: Facility In-Use IAQ Management Plan

**REQUIRMENT (cont):**

- Develop an air quality action plan to include permanent monitoring of supply and return air, and ambient air at the fresh air intake, for carbon monoxide (CO), carbon dioxide (CO 2), total volatile organic compounds (TVOCs), and particulates (including PM10).

# IEQ Credit 10: Facility In-Use IAQ Management Plan

**SUBMITTALS:** Provide a copy of the Air Quality Action Plan including sections on HVAC systems cleaning, training, and air quality monitoring. Provide cut sheets and drawing highlighting the monitoring systems.

**PROJECT DOCUMENTS:**

- ***Specifications*:** 15900 HVAC Instrumentation and Controls
- ***Drawings:*** Mechanical
- ***Design Analysis:*** Provide a draft version of the Air Quality Action Plan outlining occupant/manager training, systems maintenance schedules, and monitoring program.